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Jyrki Mikkola

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EXAMINER

LIE, ANGELA M

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/753,885	Applicant(s) MIKKOLA, JYRKI	
	Examiner ANGELA M. LIE	Art Unit 2163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 is/are allowed.
- 6) ☒ Claim(s) 1 and 13 is/are rejected.
- 7) ☒ Claim(s) 2-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 1-14 are currently pending.

Claims 1-3, 5-9 and 11-13 are rejected.

Claims 4 and 10 are objected.

Claim 14 is allowed.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. **Claims 1, 8, 12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Annabi et al (US Publication No. 2004/0145525) hereinafter Annabi.**

As to claims 1 and 13, Annabi discloses a planar antenna structure for a radio device having at least one operating band comprising: a ground plane; a radiating element (Figure 7A, element 12) galvanically isolated (as shown in figure 7A) from the ground plane (Figure 7A, element 10) and other conductive parts of the radio device (Figure 7A, element 16); a feed element having an antenna feed point (Figure 7A, element 20 and paragraph [0034], line 8), wherein the feed element (elements 20 and 16) is only electromagnetically coupled to the radiating element (12) so as to transfer energy to the radiating element and receive energy from the radiating element; and a feed circuit (20) that coupled the antenna feed point (18, paragraph [0034], line 8) to an antenna port of the radio device (paragraph [0002], i.e. radiotelephone or paragraph [0034], circuit 22 connected to the antenna's feed) or, wherein the feed circuit includes a reactive component (Figure 7A, element 54 or Figure 1, element 24) and also couples the antenna feed point (element 18, adjacent to the ground plane, wherein feed element is electromagnetically coupled to the ground plane similarly to the applicant's interpretation based on figure 4B in the specification) to the ground plane (10); whereby the at least one operating band is set to a desired range on the frequency axis and to match the antenna (paragraph [0034]).

As to claim 8, Annabi discloses a planar antenna further comprising a dielectric layer above the ground plane, the dielectric layer including a radiating element on one surface of the dielectric layer and a feed element on the opposing surface thereof (paragraph 35 and figure 7A, wherein there is air (dielectric) in between ground and radiating element).

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As to claim 12, Annabi discloses a planar antenna further comprising at least one radiating parasitic element (Figure 7A, element 12, wherein radiating element itself is considered a parasitic element since it is not electronically coupled to any of the feeding circuitry).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annabi et al (US Publication No. 2004/0145525) hereinafter Annabi in view of Tarvas et al (US Patent No. 6252552) hereinafter Tarvas.**

As to claim 2, Annabi teaches all the limitations disclosed in claim 1, however he does not explicitly teach a planar antenna wherein the feed circuit comprises a feed circuit board between the feed element and the ground plane. Tarvas teaches a planar antenna wherein feed circuitry is placed on the connector block (board) (Figure 12, element 1207). It would have been obvious to one of the ordinary skill in the art during the time the invention was made to place feed circuitry taught by Annabi on the block taught by Tarvas, for the purpose of providing additional rigid spacer to support radiating plane as well as to provide solid placement for feed circuitry.

As to claim 3, Annabi further teaches a planar antenna wherein the feed circuit board comprises a feed conductor which galvanically connects the feed point to the antenna port (Figure 7A, elements 18 and 20); and a ground conductor (Figure 7A, element 10) which electromagnetically connects the feed conductor (Figure 7A, element 18) to the ground plane (Figure 7A, element 10) at a point along the feed conductor; whereby at least two separate operating bands are provided (Figure 12).

6. **Claims 5-7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annabi et al (US Publication No. 2004/0145525) hereinafter Annabi in view of Tarvas et al (US Patent No. 6252552) hereinafter Tarvas and further in view of Kaiponen (US Patent No. 6469673).**

As to claim 5, Annabi and Tarvas teach all the limitations disclosed in claim 1, however they do not explicitly teach the radiating element, when installed, follows the contours of the outer surface of the radio device as regards its shape and position. Kaiponen teaches the antenna for the cellular phone following the contour of the outer surface of the radio device (Figure 2, element 103a; as shown in figure 2, element 106, note that in specification this element corresponds to the number 206). It would have been obvious to one of the ordinary skill in the art during the time when the invention was made to incorporate Kaiponen's placement of a radiating element in such a way as to follow the shape of a surface of the radio device, into the antenna as described in claim 1, because if the radiating element follows the shape of surface of the radio device, it would be one of the most efficient ways of using the space inside the radio device, and while keeping size of the device relatively small, radiating plane could still

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have relatively large radiating area what would lead to better radiation and receiving of a signal.

As to claim 6, Kaiponen further teaches also that the radiating element is a rigid conductive piece belonging to a cover of the radio device (as shown in figure 2, Kaiponen does not explicitly state that radiating element is a rigid component and that it is conductive, however the fact that radiating element is conductive is an inherent feature, because the radiating element in order to radiate it has to be conductive, and in regard to radiating element is rigid, it is also obvious from the figure 2, because if radiating element (Figure 2 element 106) would not be rigid, it could not be placed in parallel with ground plane and stay separated by itself because it would unstable). The radiating element also belongs to a cover of radio device (as shown in figure 2, element 106, 103a and 103b).

As to claim 7, Annabi teaches a planar antenna further wherein the conductive piece is an extrusion piece (Figure 6B, wherein antenna has rectangular shape, wherein at the very least two circular openings 16 and 50 are result of extrusion).

As to claim 11, Kaiponen also teaches at least one of the radiating element (fig 2, element 106) and feed element (Figure 2, element 207) being located inside the cover of the radio device (Figure 2, elements 103a and 103b).

7. **Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Annabi et al (US Publication No. 2004/0145525) hereinafter Annabi in view of Kaiponen (US Patent No. 6469673).** Annabi does not explicitly teach that radiating element and feed element is arranged to be attached to an inner surface of a non-

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conductive cover of the radio device. On the other hand, Kaiponen teaches an arrangement in which all the parts of the antenna listed above are attached to the non-conductive portion of the radio device (column 2 lines 2-26). It would have been obvious to one of ordinary skill in the art during the time when the invention was made to mount the antenna as described by Annabi by attaching it to an inner surface of a non-conductive cover as taught by Kaiponen, because placing antenna inside the housing definitely protects it from being broken or destroyed, and further the inner surface of the case should be non-conductive because a radiating element in the antenna should not touch the conductor since that could cause degradation in the signal and even shortage (column 2 lines 24-16).

Allowable Subject Matter

8. **Claims 4 and 10 are objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

As to claim 4, the prior art fails to teach a planar antenna as disclosed in claim 3, wherein the feed conductor and the ground conductor are meandering strip conductors, which have certain inductances which act as the reactive component.

As to claim 10, the prior art fails to teach a planar antenna structure wherein a radiating element is a conductive layer on an outer surface of the cover of the radio

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device and the feed element is a conductive layer on an inner surface of the cover of the radio device.

10. **Claim 14 is allowed.**

11. The following is an examiner's statement of reasons for allowance: the prior art fails to teach a planar antenna structure comprising: a ground plane, a radiating element galvanically isolated from other conductive parts of the radio device, a feed element, electromagnetically coupled to the radiating element, a feed circuit board including feed element and radiating element, wherein feed and ground conductors are meandering strip conductors, The ground conductor electromagnetically coupling the feed conductor to the ground plane, further wherein at least two operating band are provided.

Response to Arguments

12. Applicant's arguments filed May 21, 2008 have been fully considered but they are not persuasive.

13. With respect to the Applicant's assertion on page 2, alleging that "neither the coaxial feeder cable 20 nor the matching element 40 constitute "a feed circuit that couples the antenna feed point to an antenna port of the radio device, wherein the feed circuit includes a reactive component" as recited in independent claims 1 and 13".

14. First of all, the Examiner would like to note that the Applicant should consider the prior art for all it teaches and not only referenced sections (MPEP 2121.01 section II). Consequently, it should be clear to the Applicant that Annabi indeed does teach a feed circuitry (Figure 1A, elements 16, 18, 20, 21 and 24) connected to a radio device

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(Figure 1A, element 22 and paragraph [0037]) further wherein a reactive element allows adjusting operating band and setting it to a desired frequency range (paragraph [0034], Figure 1A, element 24). Moreover the Examiner would like to note that the coaxial cable 20 illustrated in figure 7A is the same cable 20 shown in figure 1A. Similarly all the other elements of the feed circuitry (i.e. 16, 18, 20 and 21) in the Figure 1A are the same parts illustrated in figure 7A. Thus it should be apparent that figure 1A is just more detailed illustration of the feed circuitry from the one that is exemplified in Figure 7A.

The Examiner pointed to the element 40 by mistake after looking at paragraphs [0064] - [0067]. Nevertheless the element 24 illustrated in figure 1A is also capable of adjusting operating frequency band as recited in paragraph [0034] and it is clearly a part of feed circuitry, i.e. circuitry that supplies the signal to the antenna and allows it to operate.

Hence the Examiner maintains that Annabi still teaches “a feed circuit that couples the antenna feed point to an antenna port of the radio device, wherein the feed circuit includes a reactive component”.

15. Bridging to the next page the Applicant asserts “The central conductor 18 is directed towards the passive component 16 via a hole in the ground plane perpendicular to it (see Fig. 7a). Therefore the electromagnetic coupling between the central conductor 18 and the ground plane 10 is negligible”. The Examiner disagrees with the Applicant’s view point. First of all, the claim language of the independent claims 1 and 13 is silent as to the magnitude of the electromagnetic coupling between a feed element and a ground plane, thus any amount of coupling between those two elements would be sufficient to read on currently proposed claim language. Whether the amount

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of electromagnetic coupling is negligible is a matter of mere speculation. However, it is a fact that the element 18 is not shielded (i.e. just a central conductor) with any non-conductive material as to prevent coupling, moreover it is also in a close proximity to the ground layer 10, and thus there will be at least some electromagnetic coupling.

16. Claims 1-3, 5-9 and 11-13 stand rejected.

Conclusion

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

18. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Inquiry

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela M. Lie whose telephone number is 571-272-8445. The examiner can normally be reached on M-F.

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

21. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Angela M Lie/
Examiner, Art Unit 2163

/don wong/

Supervisory Patent Examiner, Art Unit 2163